PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
METSO 6 PCT		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/FI2004/000459	16.07.2004	17.07.2003
International Patent Classification (IPC) or national classification and IPC		
G06K 19/067, G06K 7/08		
Applicant		
AVANTONE OY et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 2 sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
16.05.2005	24.10.2005
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Patrik Rydman/MP Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2004/000459

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

☐ the international application in the language in which it was filed

☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:

☐ international search (Rules 12.3(a) and 23.1(b))

☐ publication of the international application (Rule 12.4(a))

☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-8 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 9 received by this Authority on 16-05-2005

pages* 10 received by this Authority on 18-08-2005

☒ the drawings:

pages 1 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2004/000459

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-8	YES
	Claims		NO
Inventive step (IS)	Claims	1-8	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-8	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The claimed invention relates to a method and system for determining the content of a resistance mark and aims at solving the problems of prior art solutions such as that they are expensive, covers a large surface area, or needs a complicated reading device.

The solution to said problems provided by the application is to determine an absolute or relative value of one electrically conductive mark and convert the resistance value into information depicting the identity or properties of the item.

Reference is made to the following documents:
D1: US 5159181 A
D2: US 4355300 A
D3: US 5818019 A
D4: EP 0673103 A1

Document D1, which is considered to best represent the prior art, discloses a non-capacitive code reader for reading a code on an object. In one embodiment the reader can sense and analyze different ohmic resistances of a coded array (see column 5, line 65- column 6, line 19). The coded array may be written using conductive ink. D1 further discloses a reader for measuring the resistance of the mark arrangement without contact using alternating current measurement power.

Documents D2-D4 represents the general state of the art.

The subject matter of independent claim 1 differs from what is disclosed by document D1 in that only one resistive mark is

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V.

used as opposed to the array of several elements used according to the arrangement described in document D1.

The technical effect of said difference is that the surface area on which to print the conductive mark can be small in size.

The problem solved by said difference can, thus, be seen as to provide a method for identifying the content of a resistance mark which does not require a large surface are.

None of the cited documents does neither disclose, nor hint at the solution of the independent claim 1 and 8, therefore, the subject matter of said claim is inventive (Article 33(3) PCT).

Claims 2-7 all include the features of independent claim 1 and the invention according to said claims is inventive.

The invention according to claims 1-8 is novel (N) and involves an inventive step (IS).

The invention according to claims 1-8 is industrially applicable (IA) (Article 33(4) PCT).

Claims:

1. A method for identifying items, such as sheets of paper (7), or packages, or textiles, in which method

- a mark (6) made of electrically conductive material on the item (7) is read contactlessly with the aid of a measurement of alternating electricity, in order to identify the item (7), or determine its properties,

characterized in that

- the precise absolute or relative resistance value of one electrically conductive mark (6) is determined and the resistance value is converted, for example, with the aid of a coding table or calculation formula, into information depicting the identity or properties of the item.

2. A method according to Claim 1, **characterized** in that, in connection with the measurement, a reference mark is read, the resistance value of which is compared with the resistance value of the mark (6) depicting the properties or identity of the item.

3. A method according to Claim 2, **characterized** in that, in connection with the measurement, a reference mark, which consists of only electrode areas (2 and 3), is read.

4. A method according to any of the above Claims, **characterized** in that the measurement is implemented by feeding an electrical field to the conductive mark with the aid of a first pair of electrodes (4, 5) and measuring the resistance value of the conductive mark with the aid of a second pair of electrodes (2, 3).

5. A method according to any of the above Claims, **characterized** in that a conductive ink is used as the material of the conductive mark.

6. A method according to any of the above Claims, **characterized** in that a conductive polymer is used as the material of the conductive mark.

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7. A method according to any of the above Claims, **characterized** in that part of the conductive mark is made by printing methods and part by output methods.

8. A reading system for a electrically conductive mark (6), which apparatus includes means for measuring impedance contactlessly,

- the system includes means (10, 16, 17) for feeding alternating electricity measurement power contactlessly to one electrically conductive mark (6),
- means (11) for determining a signal formed of the electrically conductive mark (6),

characterized in that

- means (12, 13, 14, 15) for determining the precise absolute or relative value of the resistance component of the single electrically conductive mark (6) from this signal, and
- means (15) for decoding the resistance value of the single electrically conductive mark (6) to form code information for the conductive mark (6).